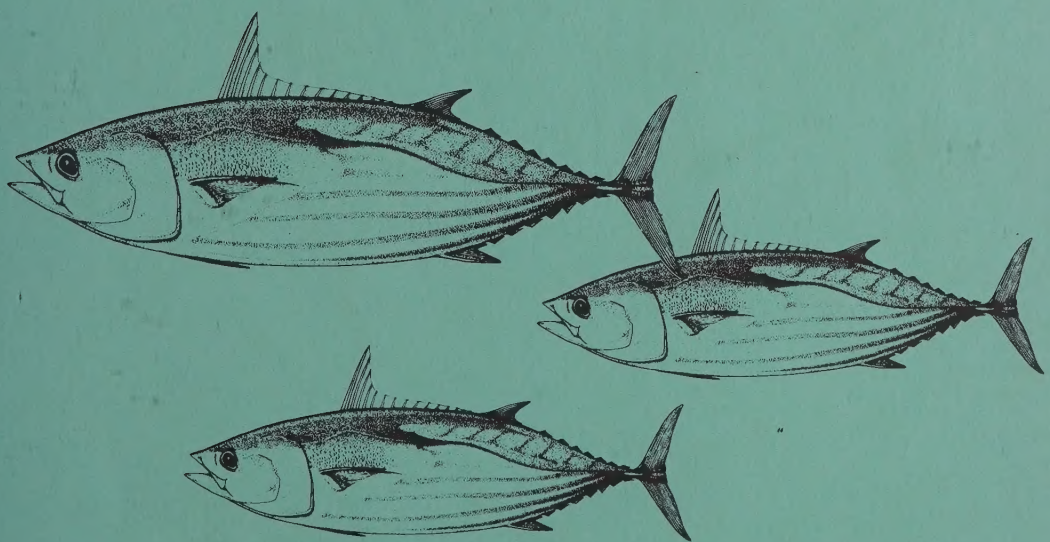
APRIL 1978
No. 4

FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California



noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / NATIONAL MARINE FISHERIES SERVICE

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST FISHERIES CENTER
8604 LA JOLLA SHORES DRIVE - P. O. BOX 271
LA JOLLA, CALIFORNIA 92037

FISHING INFORMATION

APRIL 1978, No. 4

EDITOR: JAMES A. RENNER

I. Barrett, Director, SOUTHWEST FISHERIES CENTER
J. Carr, Deputy Director

PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P.O. Box 271, La Jolla, California 92038.

Submitted for publication - May 23, 1978

CONTENTS

		Page
Acknowledgements		iv
Sea Surface Temperature and Environmental Conditions - April 1978, Forrest R. Miller		1
ENVIRONMENTAL CHARTS, PACIFIC OCEAN - April 1978		
Figure 1.	Eighteen-year mean (1961-1978) observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots) and average winds speed (knots) regardless of direction.	4
Figure 2.	Observed sea level values of barometric pressure (millibars), resultant wind direction (degrees true), resultant wind speed (knots) and average wind speed (knots) regardless of direction.	5
Figure 3.	Mean sea surface temperature, eastern North Pacific Ocean. Square shows temperatures at weathership station. Numerals on shore are temperatures at coastal and lightship stations.	6
Figure 4.	Mean sea surface temperature chart, western North Pacific Ocean.	7
Figure 5.	Deviation of sea surface temperatures, eastern North Pacific Ocean from 20-year mean (1948-67). Hatched areas are colder in 1978.	8
Figure 6.	Deviation of sea surface temperatures, western North Pacific Ocean from 20-year mean (1948-67). Hatched areas are colder in 1978.	9
Figure 7.	Deviation of sea surface temperatures, eastern North Pacific Ocean from those of April 1977. Hatched areas are colder in 1978.	10
Figure 8.	Mean sea surface temperatures, eastern tropical Pacific Ocean.	11
Figure 9.	Deviation of sea surface temperatures, eastern tropical Pacific Ocean from 20-year mean (1948-67). Shaded areas are colder in 1978. Contours are dashed in sparse data areas.	12
Figure 10.	Surface temperature and salinity and subsurface temperature structure from expendable bathythermograph observations between San Francisco and Honolulu April 6-13, 1978.	13

ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15 day Supplement)

TECHNICAL EDITOR:
R. Allen
CARTOGRAPHY:
R. Allen, H. Orr

Acknowledgements

The following organizations and stations contributed data for April 1978 charts:

Inter-American Tropical Tuna Commission, La Jolla, California
Kelco Company, San Diego, California
National Oceanic and Atmospheric Administration
National Marine Fisheries Service, La Jolla, California; Honolulu, Hawaii
National Weather Service, San Diego, California and Washington D.C.
National Ocean Survey, Pacific Marine Center, Seattle, Washington

Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia by L.F. Giovando from observations by:
J. Redhead at Langara Island Light; C.T. Hilliar at Cape St. James Light;
L. Collins at Kains Island Light; M.V. Stewart at
Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Hawaiian Queen* of the Matson Navigation Co. The data are processed under supervision of D.R. McLain at the NMFS Pacific Environmental Group, Monterey, California, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by the National Science Foundation and the Office of Naval Research.

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During April the Aleutian low pressure center normally weakens and shifts into the northern part of the Gulf of Alaska. The subtropical high pressure center shifts northward to 35°N, 150°W (Figure 1) with central pressures about 4 millibars higher than in March. The band of maximum westerlies is normally found between 45°N and 50°N where springtime storms develop in the central Pacific and move rapidly eastward into the U.S. and Canadian northwest coastal regions.

During April 1978 the Aleutian low pressure center was displaced about 30° of longitude west of its normal position. Sea level pressures south of the Aleutian Islands were 4 to 6 millibars below normal and surface winds west of 165°W and north of 35°N were more southerly than normal (Figure 2). The subtropical high pressure center was near its normal position, but surface pressures were 2 to 4 millibars below normal east of 145°W from 30°N to 45°N, caused by frequent weather systems with southerly winds moving into the eastern Pacific and reducing the effects of high pressure and northwesterly wind flow.

Sea surface temperatures (SST) remained more than 1°C above normal over most of the U.S. west coast, along Baja California and out to 130°W (Figure 5). In this large offshore area where northward bulging SST contours (Figure 3) reflected a weak northerly wind flow, coastal upwelling and ocean frontal features were considerably weakened for the past 3 months. SST's in April 1978 showed a larger positive departure from April 1977 (Figure 7) than in March 1977-78. Weak coastal winds (except from 40°N to 45°N) combined with relatively clear skies over most of the eastern Pacific resulted in a higher than normal increase in SST's. This warm condition was particularly evident southwest of Baja California where the southeastern part of the subtropical high pressure system has been weaker than normal for several months.

In the central Pacific west of 140°W, the north Pacific ocean front appeared weak between 40°N and 43°N where SST contours were more widely spaced than normal. The area between 140°W and 180° covered by negative departures greater than 1°C was significantly reduced in size from March 1978. This was partly due to the lower frequency of intense storms moving into the eastern Pacific and the presence of high pressure and lighter winds between 140°W and 160°W. This resulted in SST's increasing at a higher rate than normal over the eastern Pacific west of 140°W. However, this part of the eastern Pacific remained about 0.5°C colder than in April 1977 (Figure 7). There appears to be a general trend of SST's returning to normal north of 25°N, but a warming trend prevails south of 25°N between 115°W and 140°W.

Western Pacific

During April 1978 the Aleutian low pressure system extended into the western Pacific and was centered near 55°N, 179°E. Southwest of the Aleutian low, storm centers frequently developed east of Japan and moved eastward along 40°N, becoming more intense in the central Pacific. Alternating patterns of weather fronts and high pressure centers moved eastward between 35°N and 25°N around the periphery of the western extension of the Aleutian low.

The north Pacific ocean front was well defined, especially off the north coast of Japan where the Kuroshio Current carried warm water northward (Figures 4 and 6). The front was also strong east of 160°E near 40°N in the zone of strongest westerly winds between the Aleutian low and the western half of the subtropical Pacific high pressure system. Strong wind mixing and advection of colder water from the north helped to maintain a strong frontal boundary north of 40°N between 160°E and 180° where negative SST departures were greater than 1°C (Figure 6). South of 30°N and east of 140°E a large area of negative SST departures has persisted for several months. The southern extensions of weather fronts with strong winds and rough seas moved into this area from

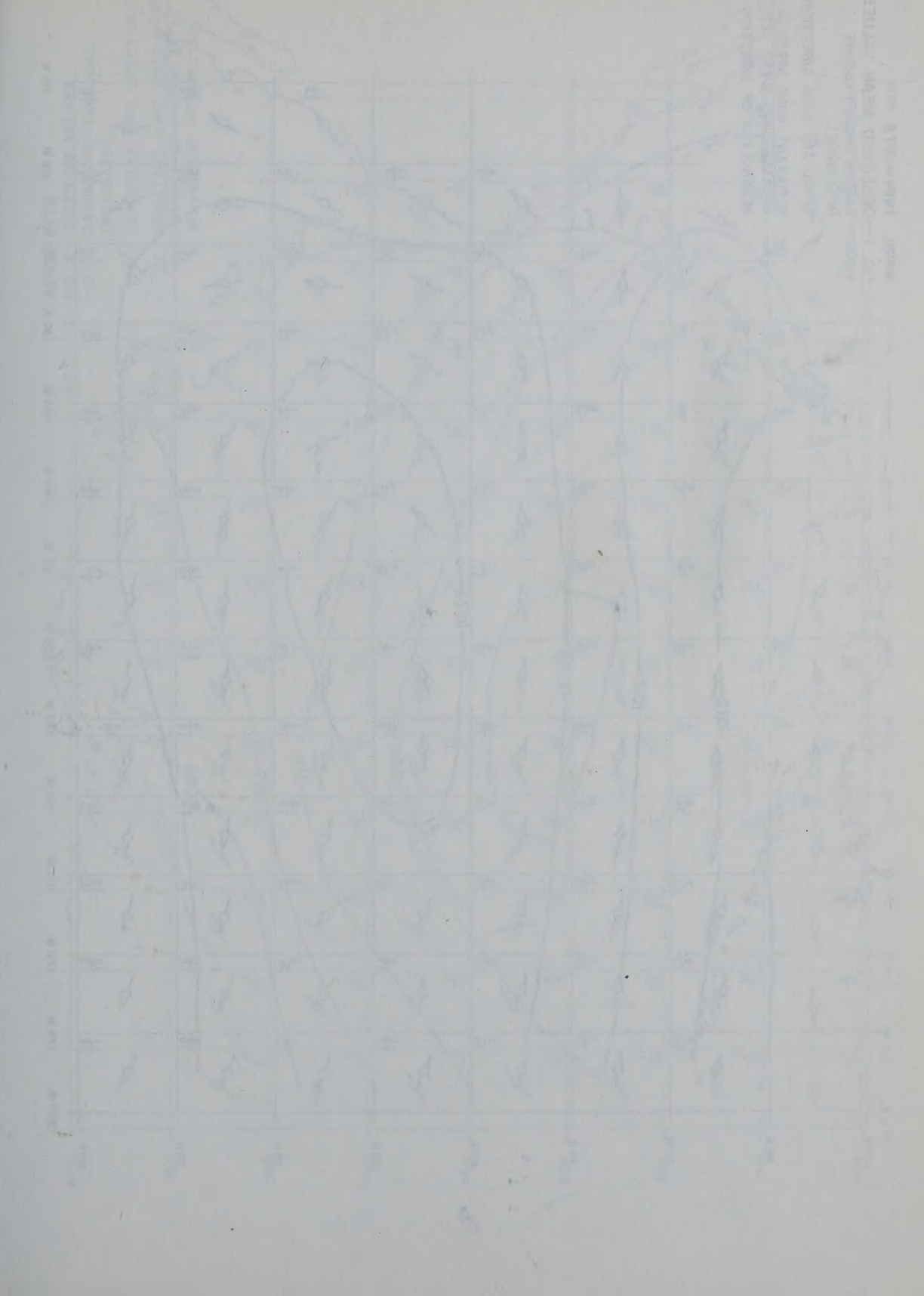
the north several times during April and caused extensive ocean mixing. Over the past 3 months, the more southerly trajectories of storm fronts led to the development of a more pronounced subtropical ocean front than normal between 24°N and 27°N (Figure 4).

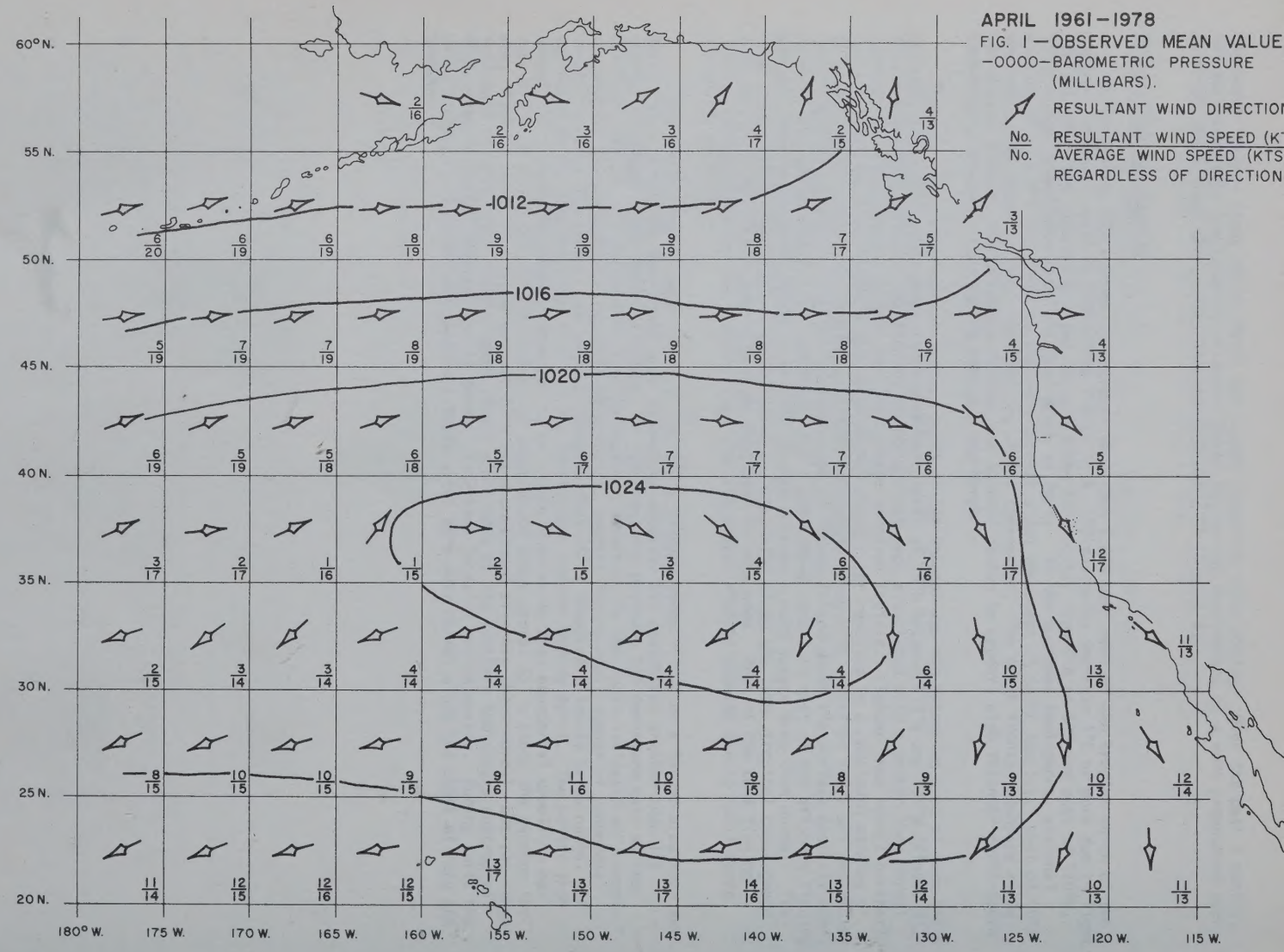
Eastern Tropical Pacific

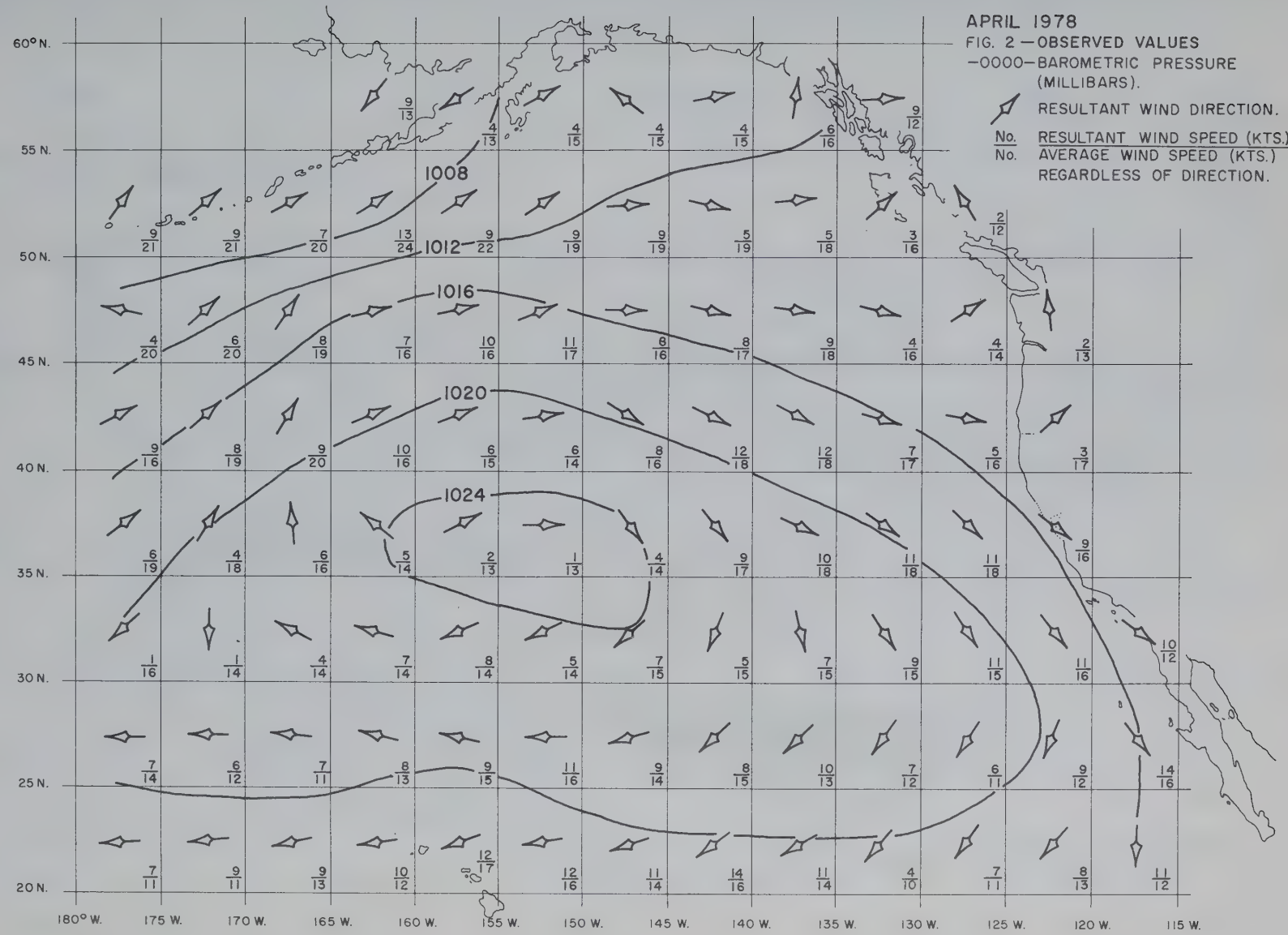
During April, SST's normally increase less than 1.0°C over most of the tropics north of the equator. However, east of 110°W from 7°N to 12°N, SST's usually increase 1°C or more due to light surface winds and relatively clear skies. Along the equator from 5°N to 5°S and east of 110°W, SST's normally decrease about 1°C from March to April. In the southern hemisphere, seasonal cooling of 1 to 2°C is normal in the Peru Current along the coast of South America. West of 90°W the cooling is normally less than 0.6°C as winter approaches. The ocean frontal boundary along the equator between the Galápagos Islands and Ecuador begins to appear, with stronger north-south temperature gradients than during February and March.

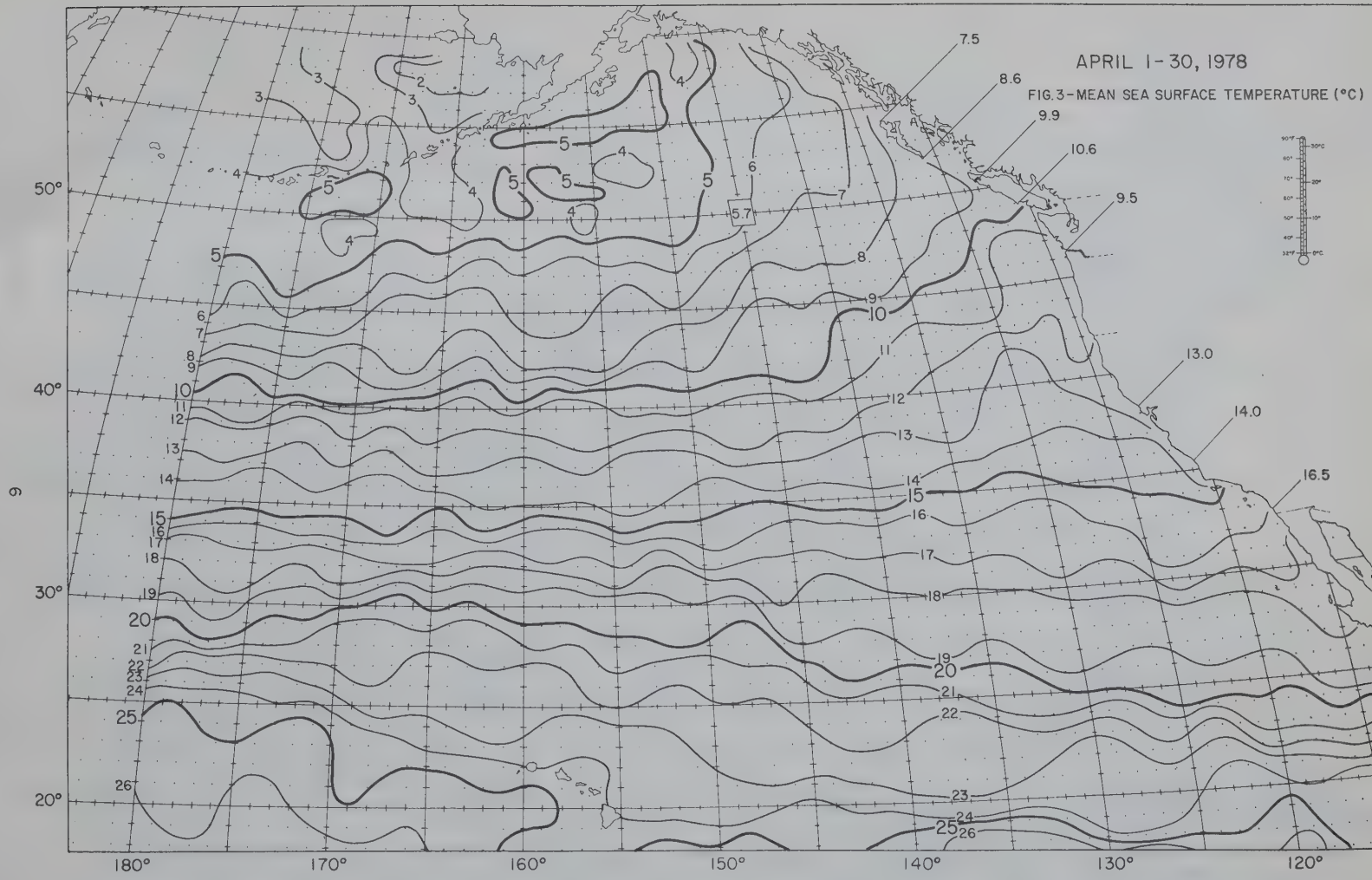
In April 1978, the dominant feature north of the equator was the extensive area of warm SST's and very weak north-south temperature gradients north of 15°N between 115°W and 135°W (Figure 8). This feature has persisted for several months and has been associated with a weaker than normal subtropical high pressure system over the eastern tropical Pacific. Lighter than normal northerly surface winds and significantly less than normal cloud cover resulted in a continued warming of SST's over most of the area southwest of Baja California (Figure 9). West of 140°W SST departures from normal were small, except for an area south of Midway Island where the surface easterly winds were 2-4 kts below normal. East of 110°W, SST's were above normal in most of the offshore fishing grounds where SST's were greater than 29°C (Figure 8) over a much larger area than normal. Frequent rain squalls developed in the warm zones, especially along the inter-tropical convergence zone, and tropical storms with high winds developed in this area. Most of the tuna fishing activity moved closer to the inshore (less than 200 miles) fishing grounds during April where SST's were cooler.

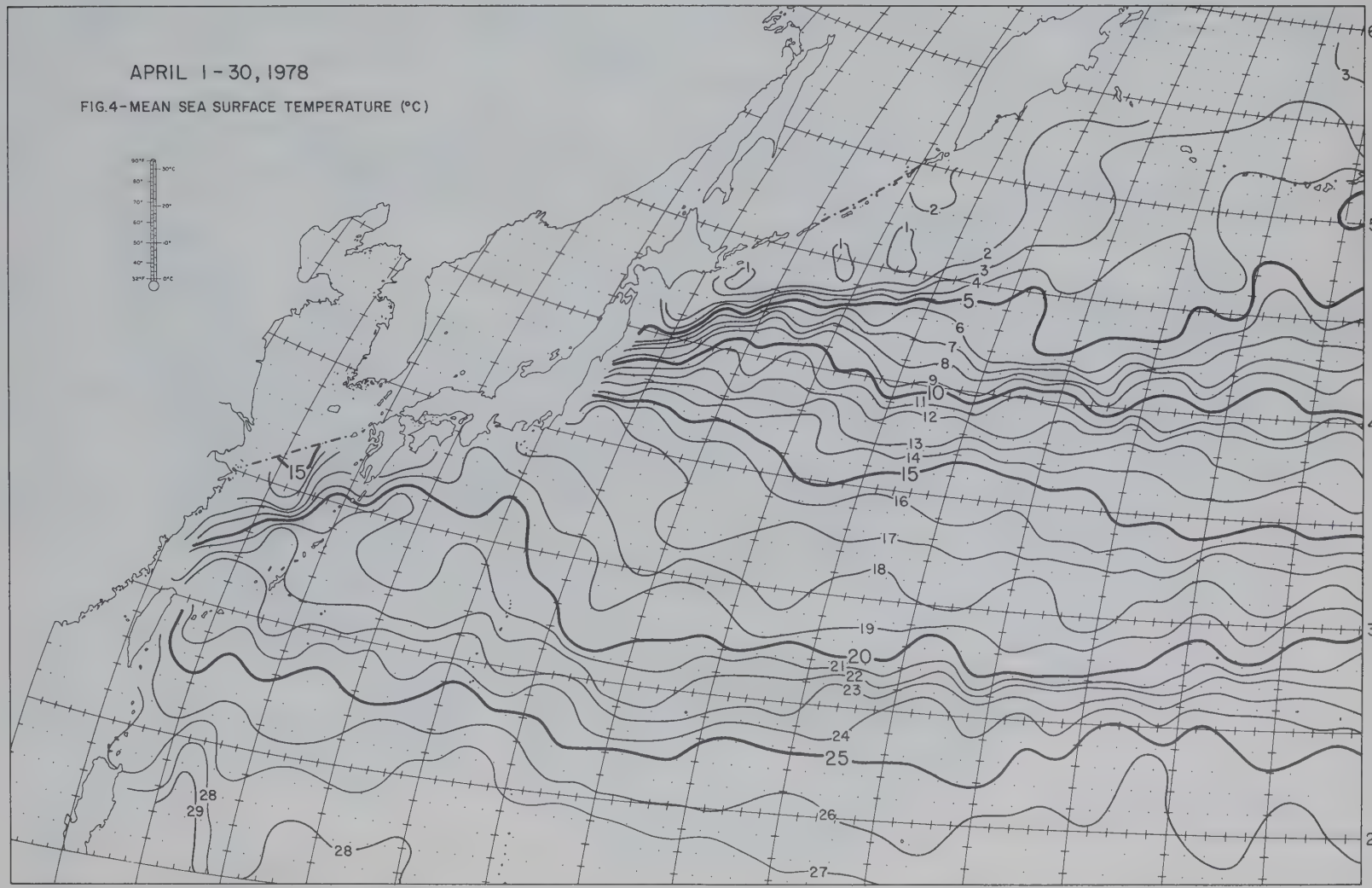
Along the equator, between 5°N and 5°S, SST's dropped below 25°C over a larger area than any April since 1974. The equatorial area covered by negative SST departures greater than 1°C increased markedly from March to April. In addition, the positive SST departure east of the Galápagos Islands and adjacent to a large negative departure to the south indicated an intensification of the equatorial front west of Ecuador. Reports from a small number of commercial vessels sailing along the coast of Peru revealed that SST's remained slightly below normal and decreased at the seasonal rate of 1 to 2°C in the Peru Current during April. The colder than normal SST's along the equator appeared to be a good indication that equatorial upwelling has expanded into areas west of 90°W which had experienced above normal SST's along the equator for many months. South of 5°N and west of 85°W SST's continued slightly above normal, but the large reservoir of warm south Pacific water slowly diminished as the southern hemisphere subtropical high pressure system returned to its normal wintertime location and intensity. During April the surface pressure gradient and southeast trade winds were near normal along the coast of Peru and Ecuador.

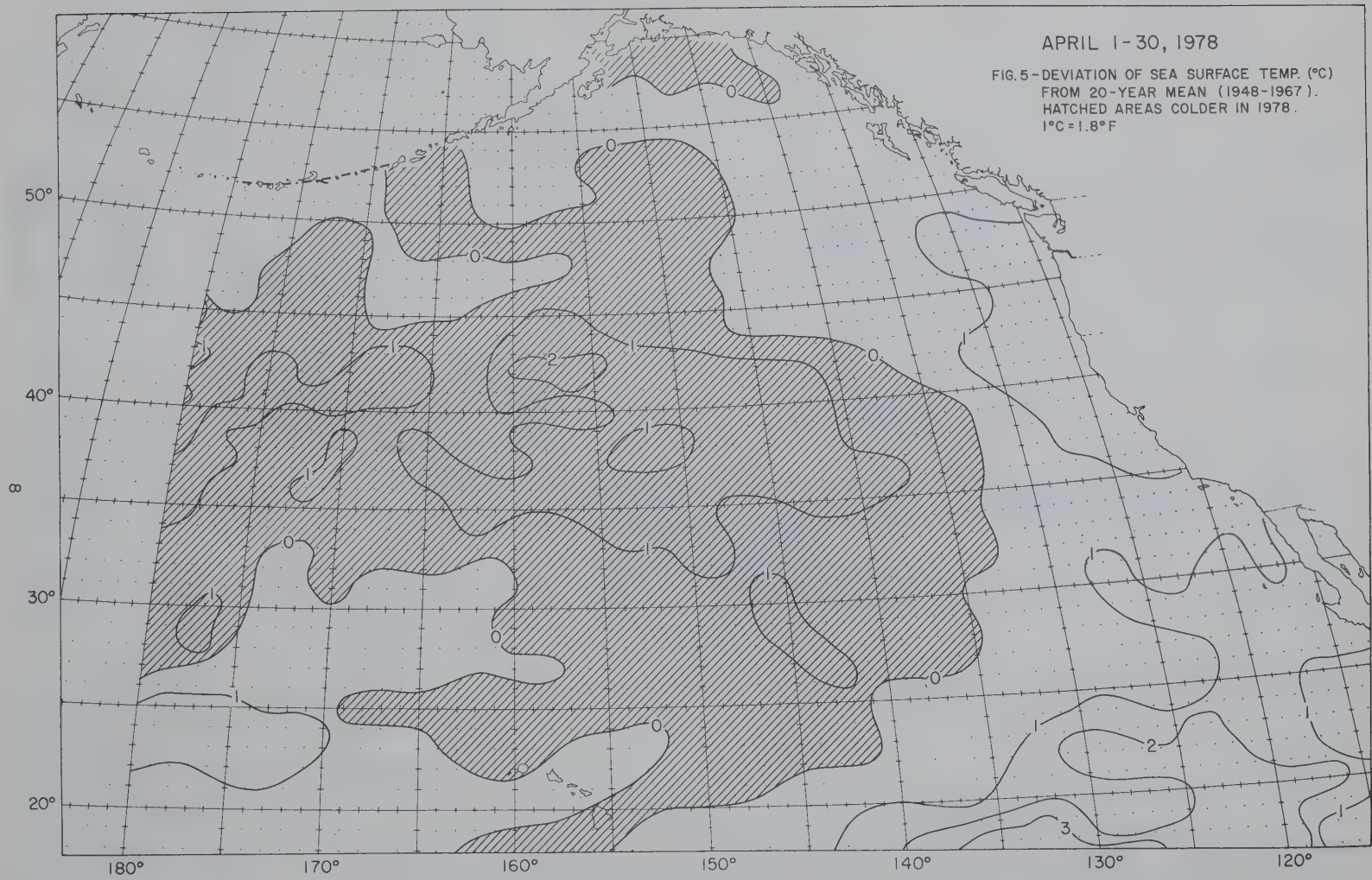


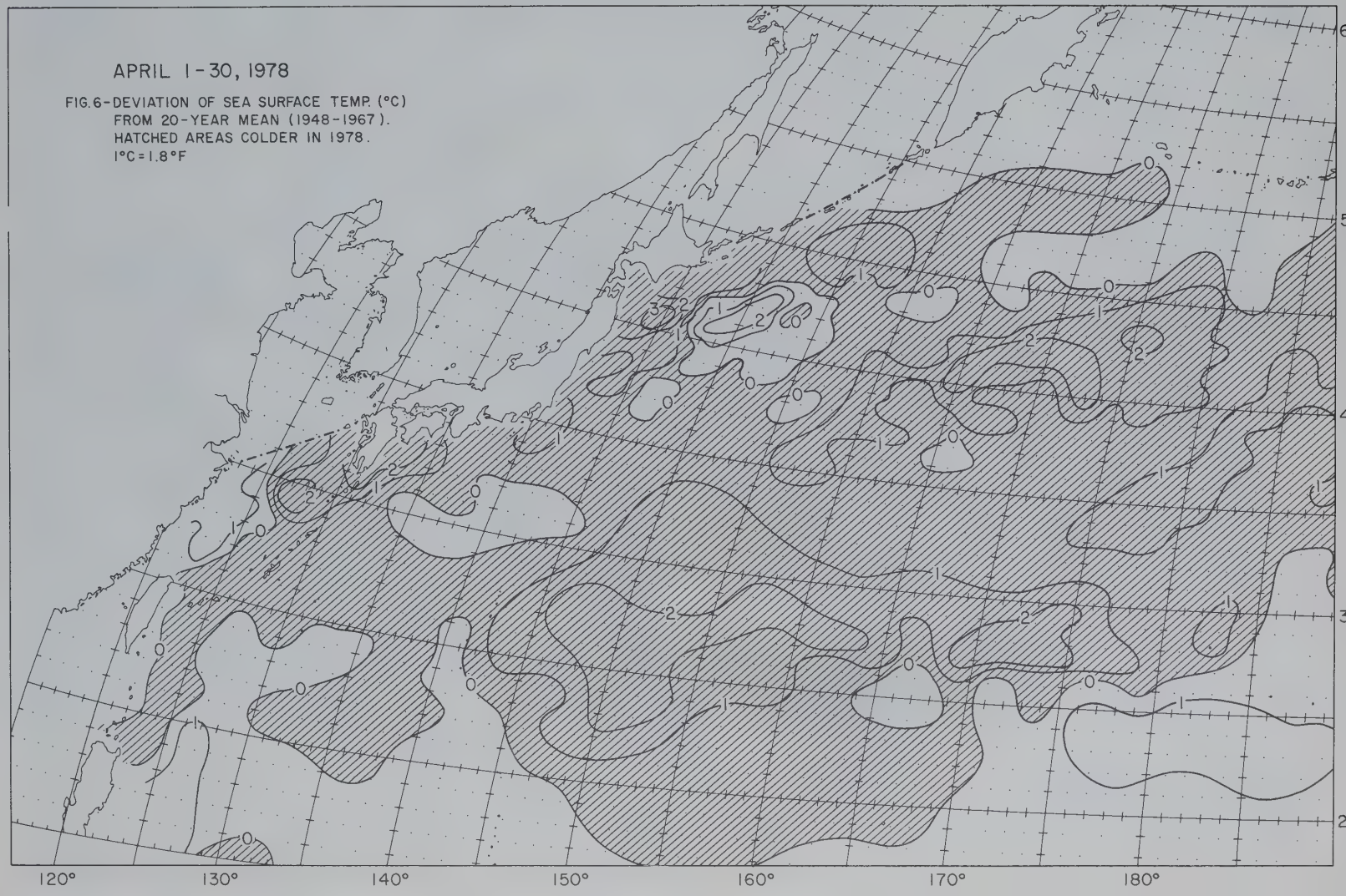

APRIL 1961–1978
FIG. 1—OBSERVED MEAN VALUE
—0000—BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION
No. RESULTANT WIND SPEED (KT
No. AVERAGE WIND SPEED (KTS REGARDLESS OF DIRECTION
1012
1016
1020
1024
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

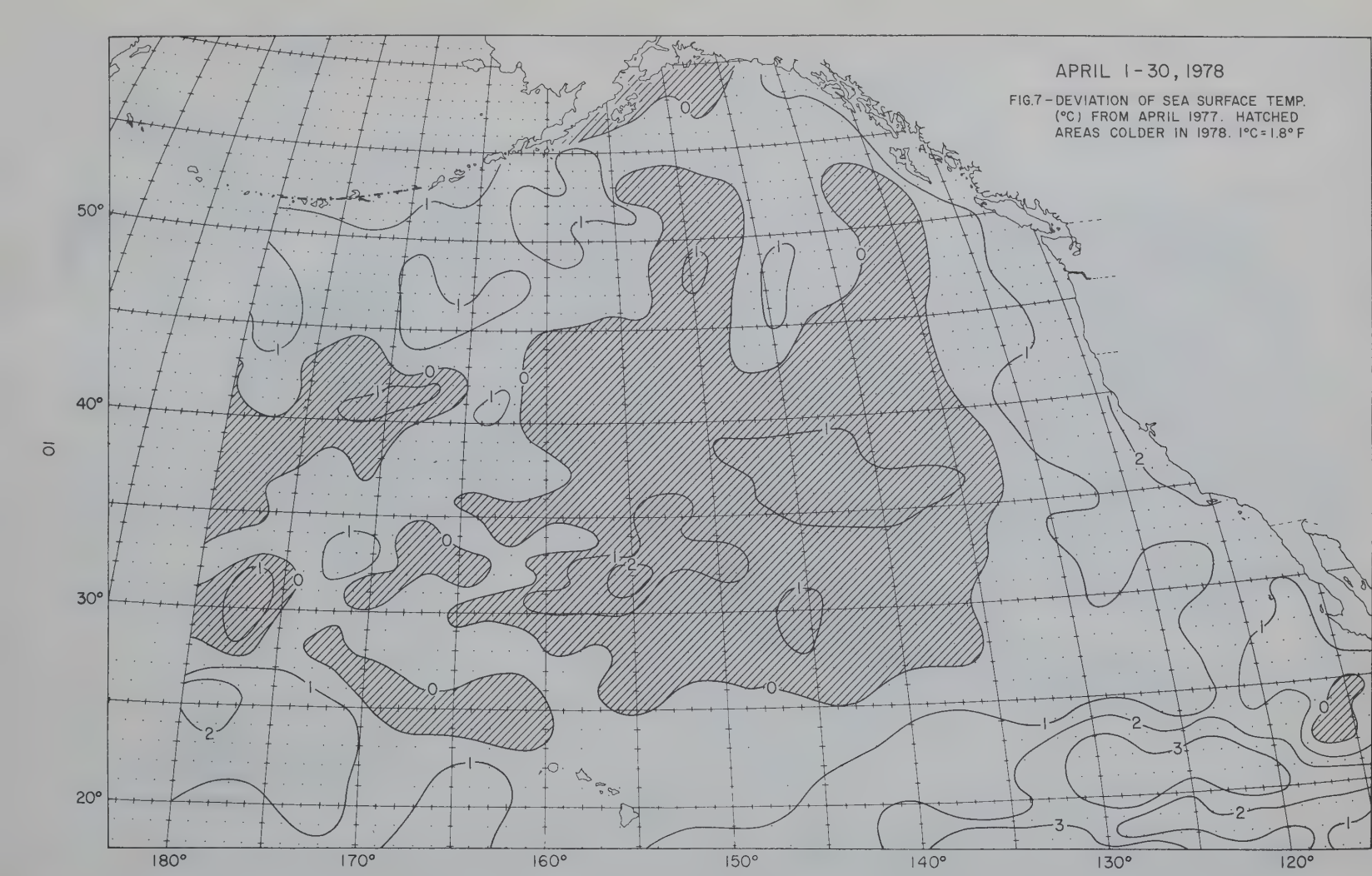

APRIL 1978
FIG. 2 —OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1008
1012
1016
1020
1024
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

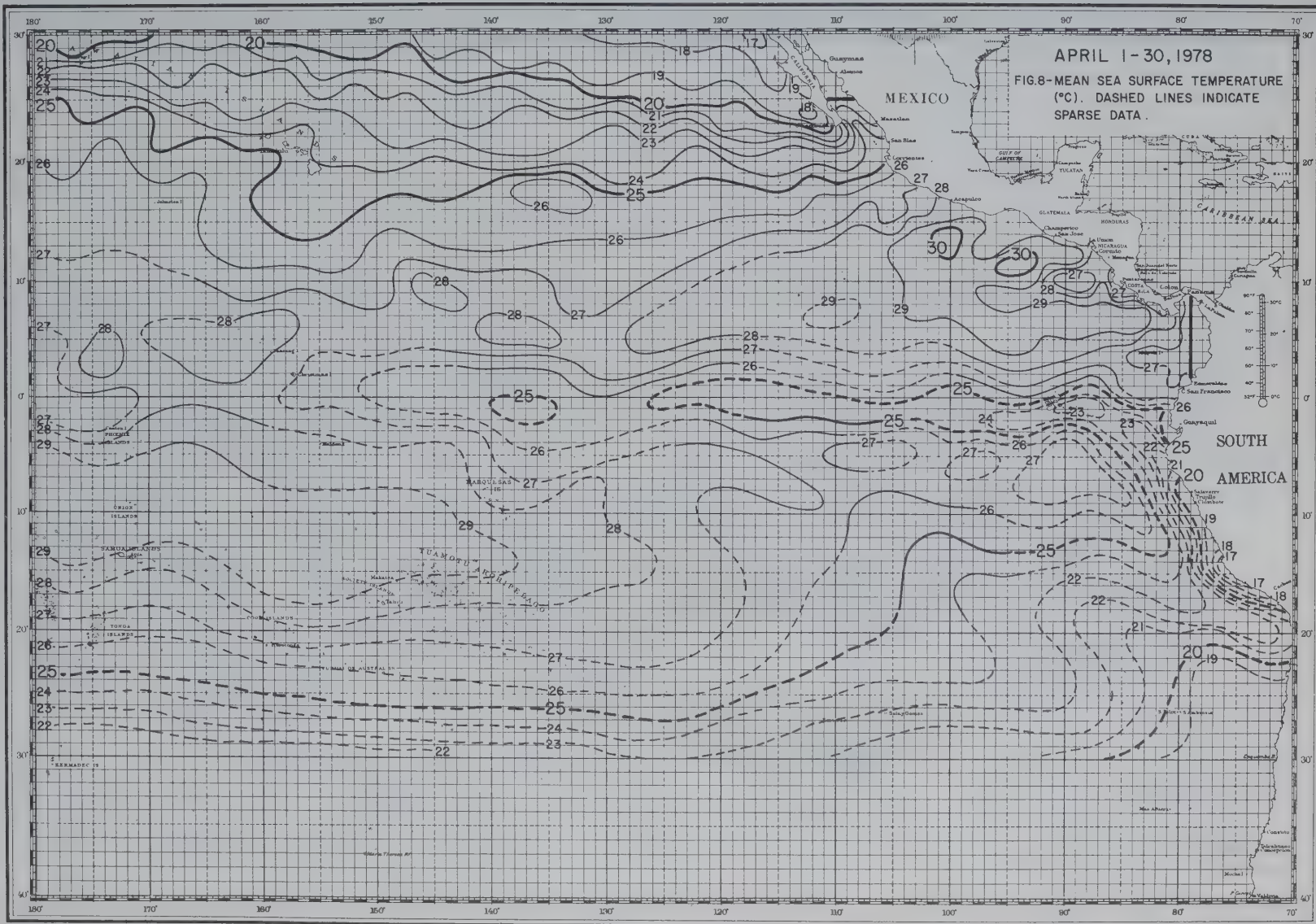

APRIL 1-30, 1978
FIG. 3-MEAN SEA SURFACE TEMPERATURE (°C)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
7.5
8.6
9.9
10.6
9.5
13.0
14.0
16.5
5.7


APRIL 1 - 30, 1978
FIG.4-MEAN SEA SURFACE TEMPERATURE (°C)
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°
3
2
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
28
15


APRIL 1-30, 1978
FIG. 5 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20-YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1978. 1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
1
2
3


APRIL 1-30, 1978
FIG. 6-DEVIATION OF SEA SURFACE TEMP. (°C)
FROM 20-YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1978.
1°C = 1.8°F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


APRIL 1-30, 1978
FIG.7-DEVIATION OF SEA SURFACE TEMP. (°C) FROM APRIL 1977. HATCHED AREAS COLDER IN 1978. 1°C=1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


APRIL 1-30, 1978
FIG.8-MEAN SEA SURFACE TEMPERATURE (°C). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
CUBA
GULF OF MEXICO
YUCATAN
Acapulco
Manzanillo
Guaymas
Mazatlan
San Blas
Guayaquil
San Francisco
Salaverry
Trujillo
Chimbote
MARQUESAS
TUAMOTU ARCHIPELAGO
SAMOA ISLANDS
TONGA ISLANDS
UNION ISLANDS
PHOENIX ISLANDS
KERMADEC IS
Johnston I
Malpelo I
Cocos I
Easter I
Juan Fernandez Arch
Galapagos Is
Chanperico
San Jose
Corinto
Colon
Cartagena
Maracaibo
Barranquilla
Puerto Limon
Puntarenas
Manzanillo
Tehuantepec
Salina Cruz
Progreso
Campeche
Veracruz
Tampico
Havana
Nassau
Haiti
Jamaica
Belize
Roatan I
Swan Is
Providencia I
San Andres I
Aruba
Curacao
Margarita I
Trinidad
Tobago
Barbados
Martinique
Guadeloupe
Puerto Rico
Virgin Is
Antigua
Montserrat
Nevis
St Kitts
Anguilla
St Martin
St Barthelemy
Saba
St Eustatius
Dominica
St Lucia
St Vincent
Grenadines
Grenada
Aves I
Los Roques
Las Aves
Los Testigos
Los Frailes
Orchila I
La Tortuga
Blanquilla I
Margarita I
Coche I
Cubagua I
Tobago Cays
Union I
Palm I
Petit St Vincent
Carriacou
Petite Martinique
Isla de Aves
Isla de Sola
Isla de Patos
Isla de Pedernales
Isla de Plata
Isla de la Tortuga
Isla de Margarita
Isla de Coche
Isla de Cubagua
Isla de Tobago
Isla de Trinidad
Isla de Barbados
Isla de Martinique
Isla de Guadeloupe
Isla de Puerto Rico
Isla de Virgin
Isla de Antigua
Isla de Montserrat
Isla de Nevis
Isla de St Kitts
Isla de Anguilla
Isla de St Martin
Isla de St Barthelemy
Isla de Saba
Isla de St Eustatius
Isla de Dominica
Isla de St Lucia
Isla de St Vincent
Isla de Grenadines
Isla de Grenada

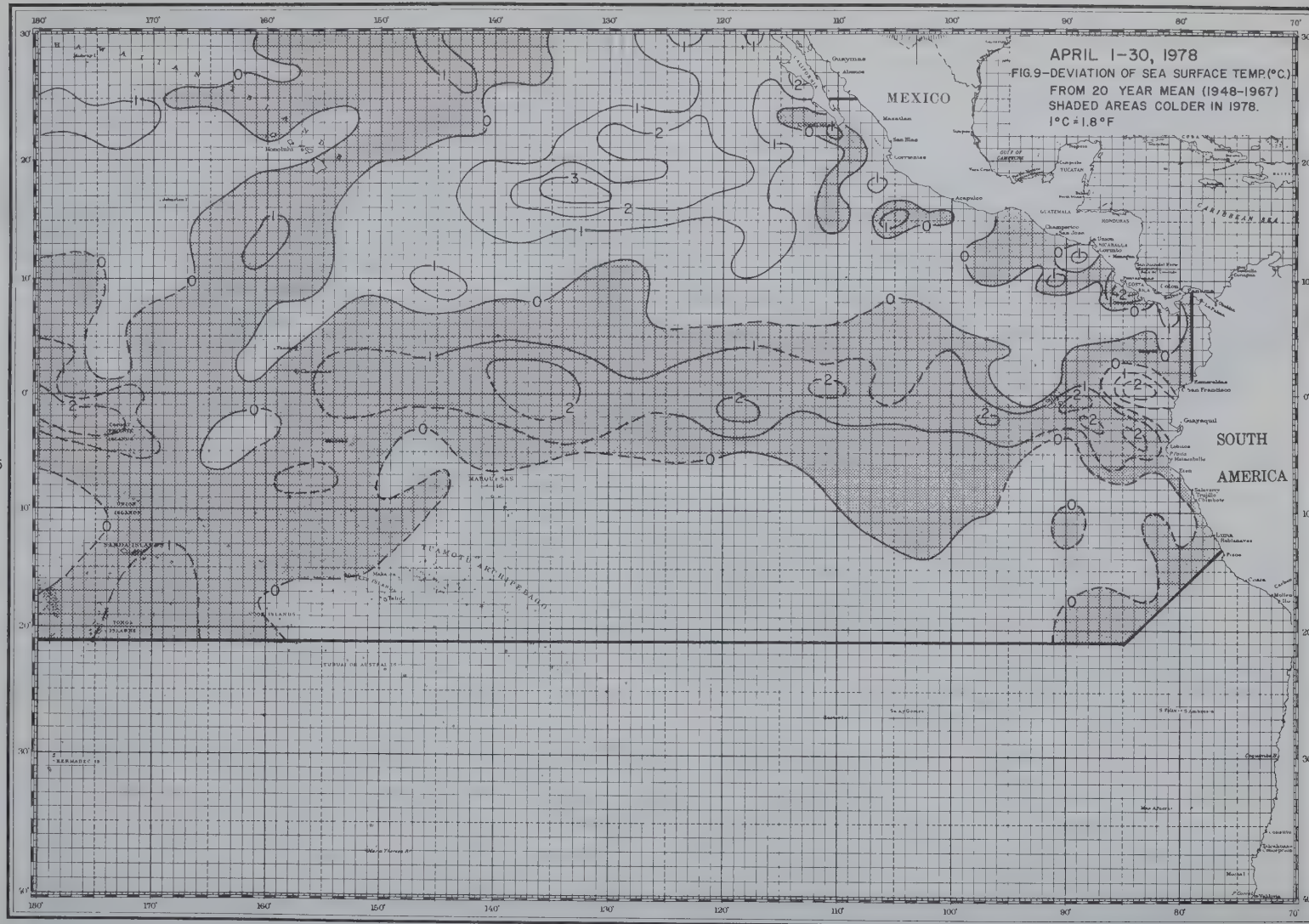

APRIL 1–30, 1978
FIG.9–DEVIATION OF SEA SURFACE TEMP.(°C.)
FROM 20 YEAR MEAN (1948–1967)
SHADED AREAS COLDER IN 1978.
1°C = 1.8°F
MEXICO
SOUTH
AMERICA
CARIBBEAN SEA
Honolulu
Acapulco
Guayaquil
San Francisco
TUAMOTU ARCHIPELAGO
MARQUESAS
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
40°

FIGURE 10

SHIP HAWAIIAN QUEEN

VOYAGE 223

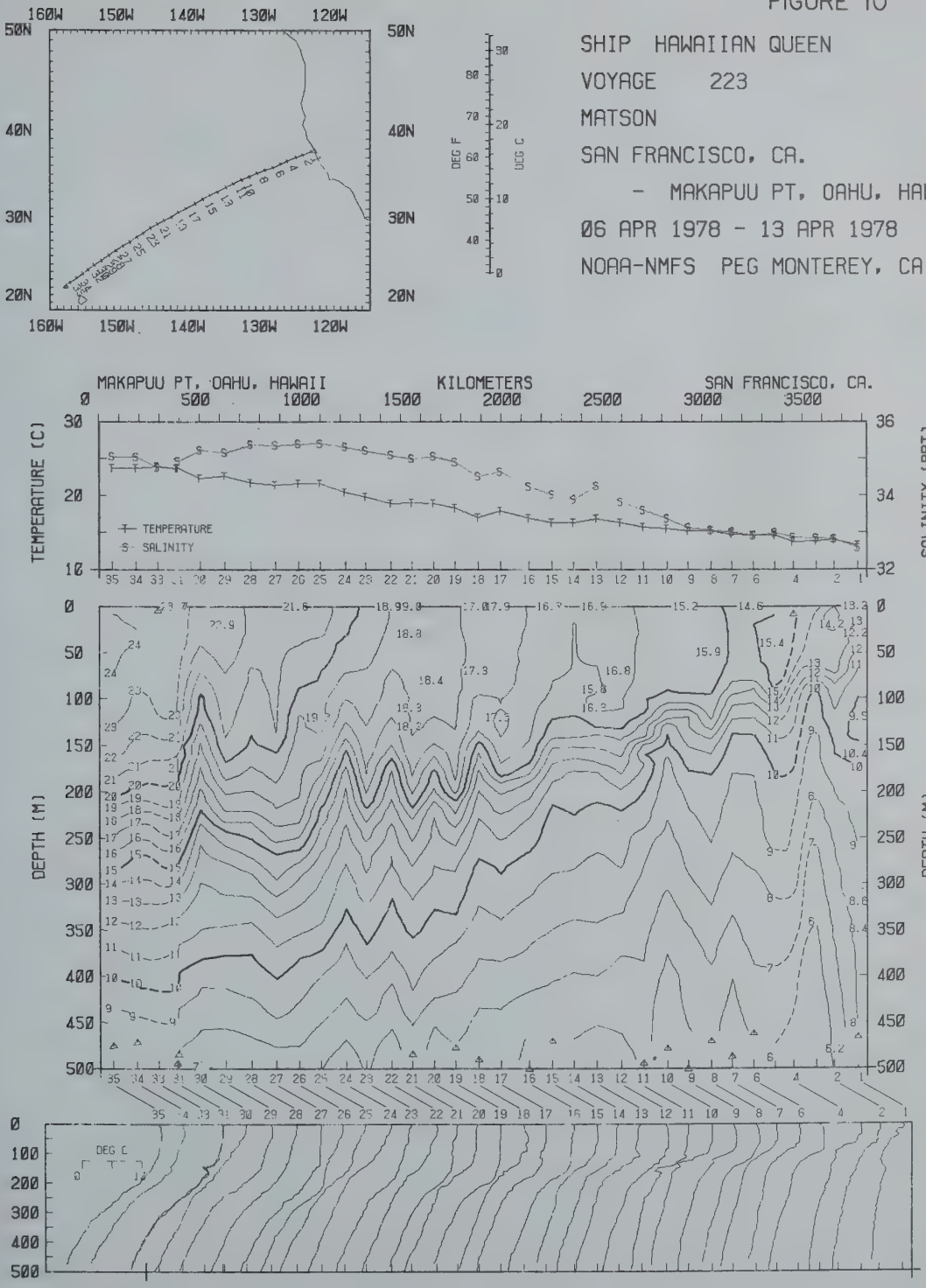
MATSON

SAN FRANCISCO, CA.

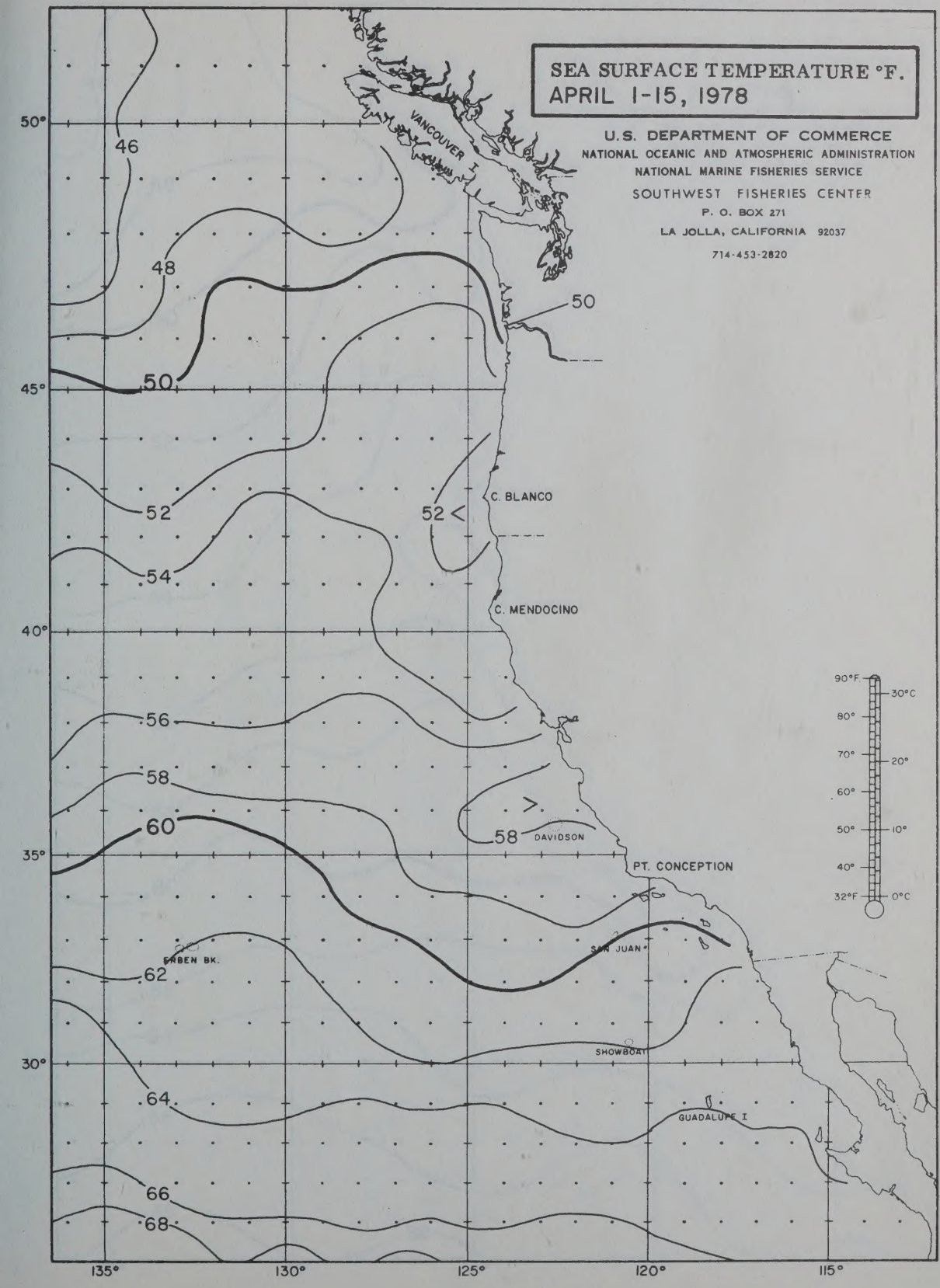
- MAKAPUU PT, OAHU, HAWAII

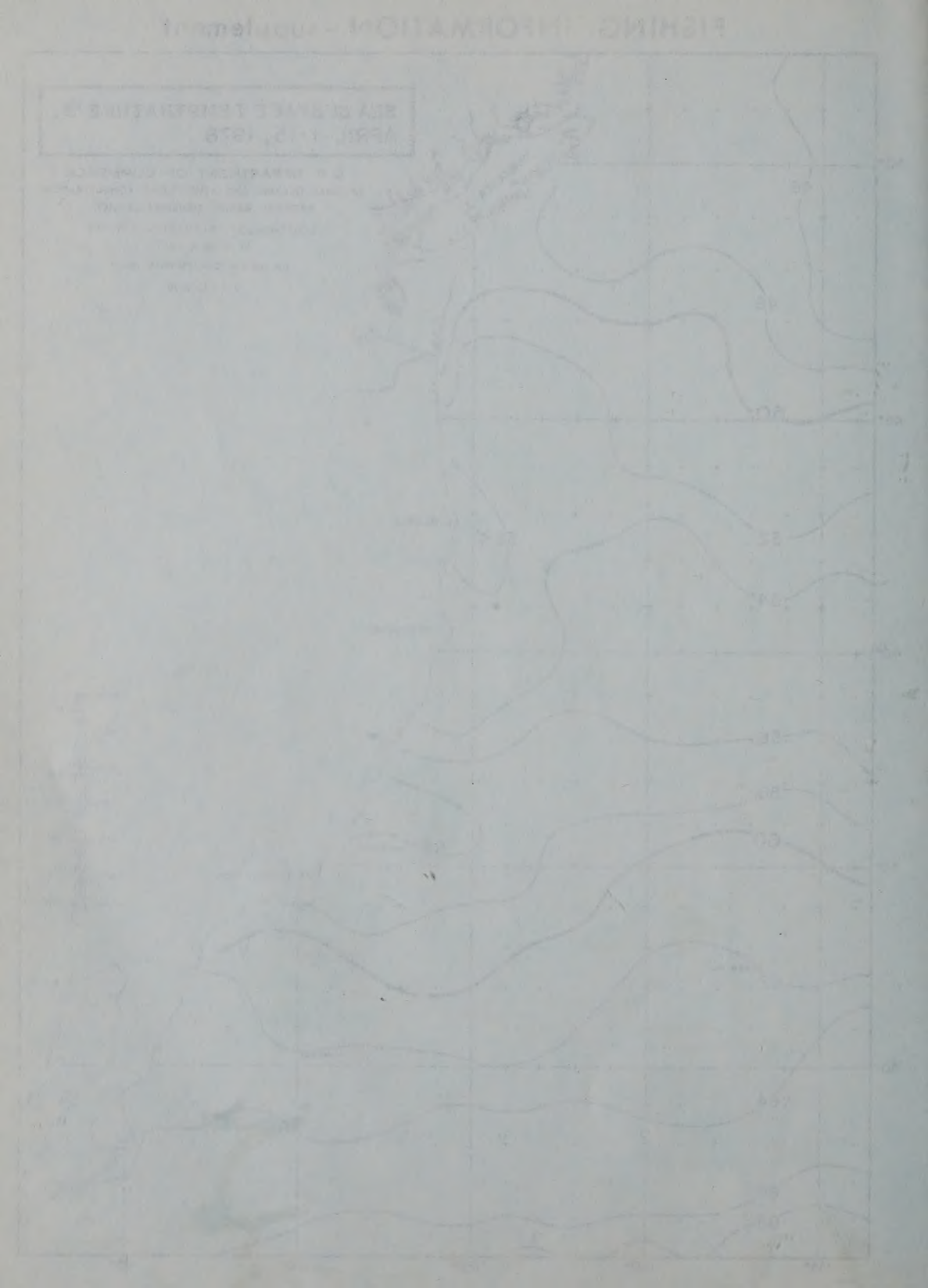
06 APR 1978 - 13 APR 1978

NOAA-NMFS PEG MONTEREY, CA.



FISHING INFORMATION – supplement





FISHING INFORMATION – supplement